

### Description

The STTH2R02AF-Y, implementing ST's new 200 V planar technology, is especially suited for switching mode base drive and transistor circuits. The device is also intended for use as a free wheeling diode in power supplies and other power switching applications in automotive functions.

**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	2 A
$V_{RRM}$	200 V
$T_j$ (max)	175 °C
$V_F$ (typ)	0.72 V
$T_{rr}$ (typ)	15 ns

### Features

- Low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- AEC-Q101 qualified
- ECOPACK<sup>®</sup>2 compliant component
- PPAP capable

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at  $T_j = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	$T_j = -40\text{ °C}$	200	V
$I_{F(AV)}$	Average forward current, square waveform	$T_L = 129\text{ °C}, \delta = 0.5$	2	A
$I_{FSM}$	Surge current non repetitive forward current	$t_p = 8.3\text{ ms}$ sinusoidal	50	A
$T_{stg}$	Storage temperature range		-65 to + 175	°C
$T_j^{(1)}$	Operating temperature range		-40 to + 175	°C

1.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal resistance**

Symbol	Parameter	Typ.	Max.	Unit
$R_{th(j-l)}$	Junction to lead	16	24	°C/W

**Table 4. Static electrical characteristics**

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			0.8	$\mu\text{A}$
		$T_j = 125\text{ °C}$			1	8	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$		0.91	1.02	V
		$T_j = 150\text{ °C}$			0.72	0.83	

1. Pulse test:  $t_p = 5\text{ ms}, \delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}, \delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.71 \times I_{F(AV)} + 0.06 \times I_F^2(RMS)$$

**Table 5. Dynamic electrical characteristics**

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}, dI_F/dt = -100\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$		15	20	ns
			$I_F = 1\text{ A}, dI_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$		22		
		$T_j = 125\text{ °C}$	$I_F = 2\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 160\text{ V}$		22		
$Q_{RR}$	Reverse recovery charge	$T_j = 125\text{ °C}$	$I_F = 2\text{ A}, dI_F/dt = -200\text{ A}/\mu\text{s},$ $V_R = 160\text{ V}$		40		nC
$I_{RM}$	Reverse recovery current				3		A

Figure 1. Average forward power dissipation versus average forward current

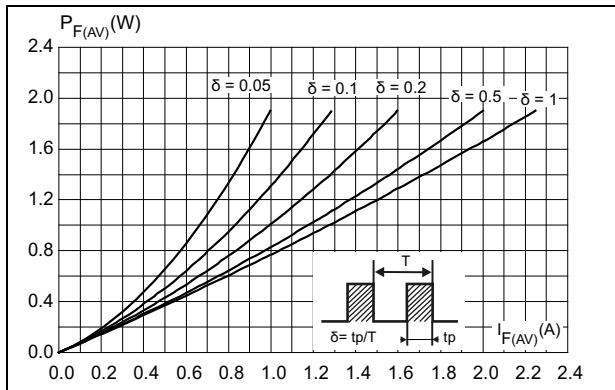


Figure 2. Forward voltage drop versus forward current (typical values)

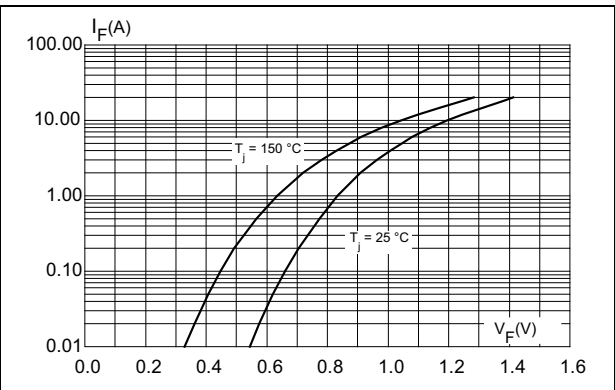


Figure 3. Forward voltage drop versus forward current (maximum values)

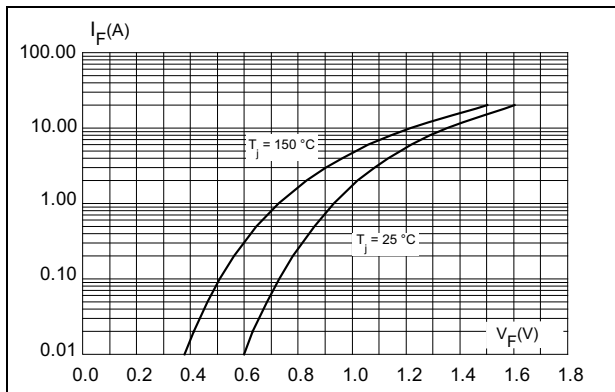


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

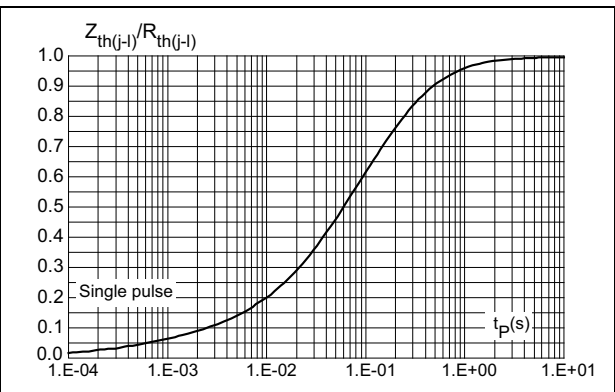


Figure 5. Reverse recovery charges versus  $di_F/dt$  (typical values)

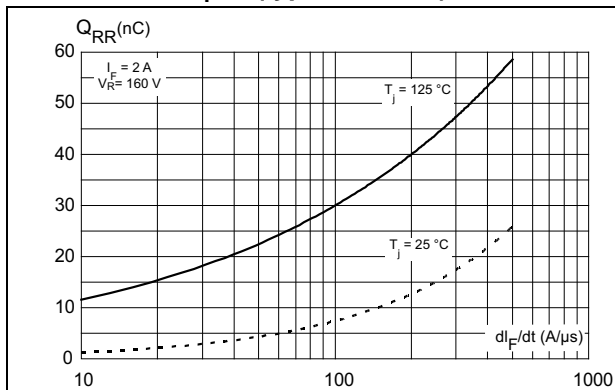


Figure 6. Reverse recovery time versus  $di_F/dt$  (typical values)

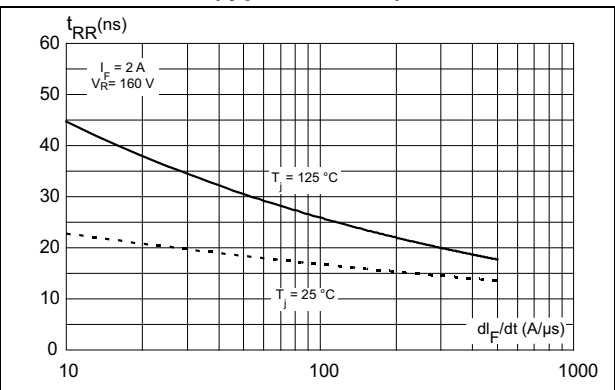


Figure 7. Peak reverse recovery current versus  $di_F/dt$  (typical values)

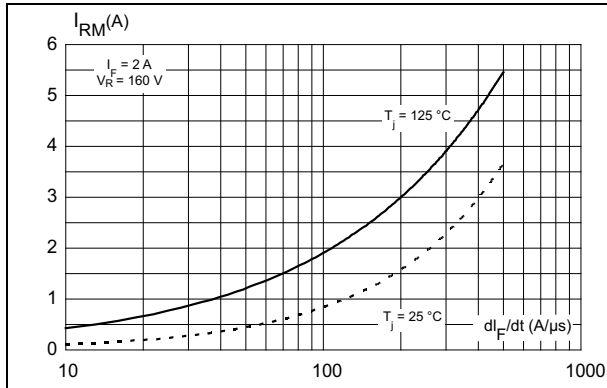


Figure 8. Dynamic parameters versus junction temperature

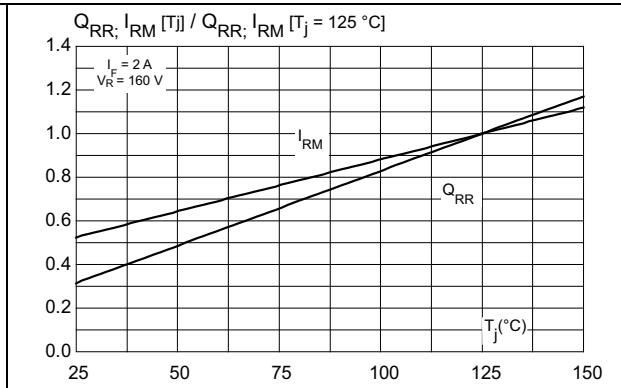


Figure 9. Junction capacitance versus reverse voltage applied (typical values)

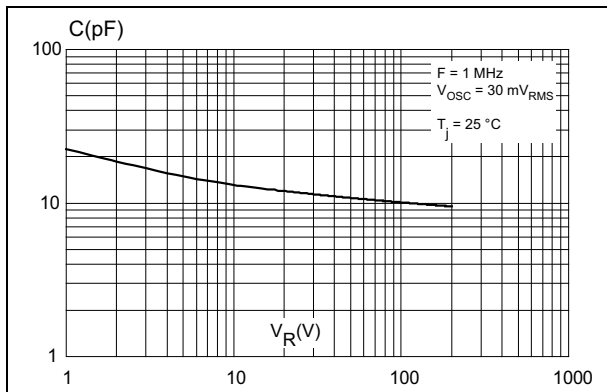
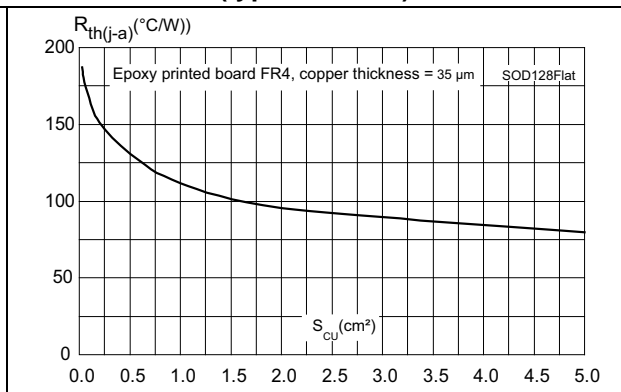


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



## 2 Package information

- Epoxy meets UL94,V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

Figure 11. SOD128Flat package outline

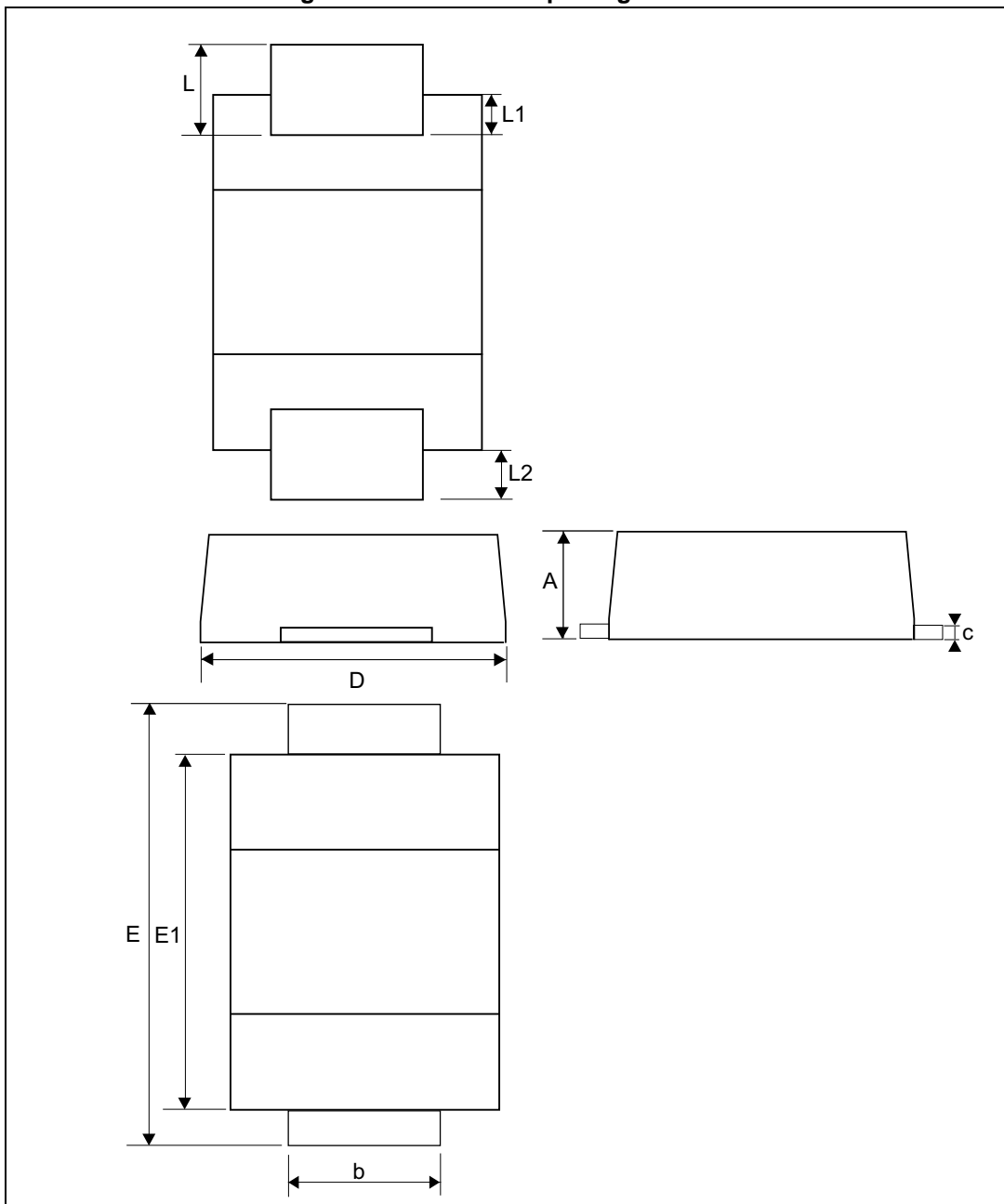
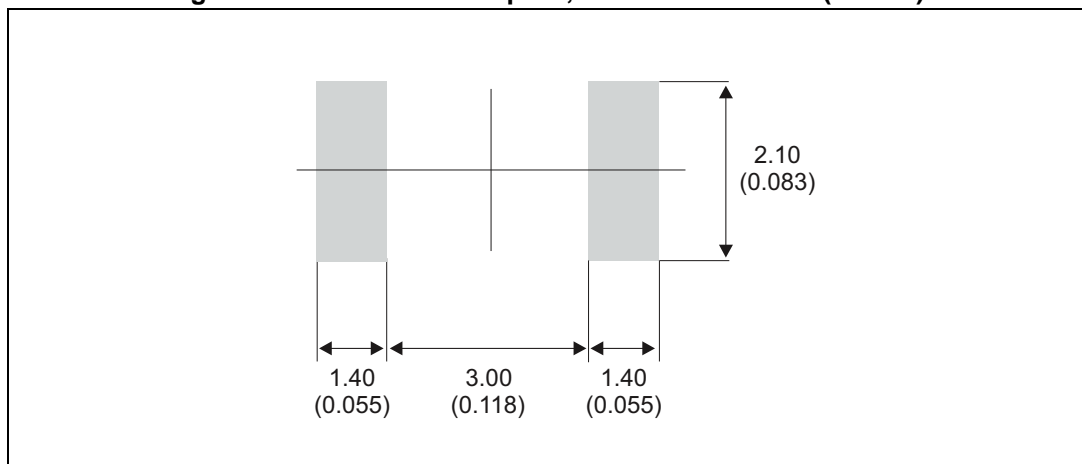


Table 6. SOD128Flat package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.93		1.03	0.037		0.041
b	1.69		1.81	0.067		0.071
c	0.10		0.22	0.004		0.009
D	2.30		2.50	0.091		0.098
E	4.60		4.80	0.181		0.189
E1	3.70		3.90	0.146		0.154
L	0.55		0.85	0.026		0.033
L1		0.30			0.012	
L2		0.45			0.018	

Figure 12. SOD128Flat footprint, dimensions in mm (inches)



### 3 Ordering information

Table 7. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STTH2R02AFY	2R2AY	SOD128Flat	26.4 mg	3000	Tape and reel

### 4 Revision history

Table 8. Document revision history

Date	Revision	Changes
27-Feb-2015	1	Initial release.

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